

## CURRICULUM VITAE (CV)

### Professor Heikki Kälviäinen

#### 1. Full name and date

- Surname: Kälviäinen.
- Given names: Heikki Antero.
- Gender: male.
- Date of writing the CV: see the header.

#### 2. Date and place of birth, nationality, current residence

- Date and place of birth: March 31, 1963, Lappee, Finland.
- Citizenship: Finland.
- Current residence:

*Work address:*

Lappeenranta-Lahti University of Technology LUT<sup>1</sup>, Computer Vision and Pattern Recognition Laboratory (CVPR)<sup>2</sup>, Department of Computational and Process Engineering (CAPE), LUT School of Engineering Science, P.O. Box 20, FI-53851 Lappeenranta, Finland.

Mobile: +358 40 5867552

Heikki.Kalviainen@lut.fi

<http://personal.lut.fi/users/heikki.kalviainen/>

*Home address:*

Uranuksenkatu 27, 53850 Lappeenranta, Finland.

- Family status: Married to M.Sc. (Eng.), Mrs. Katarina Kälviäinen.

#### 3. Education and degrees awarded

- Doctor of Science (Technology), Lappeenranta University of Technology (LUT)<sup>3</sup>, Finland, major subject: Computer Science and Engineering, minor subject: Data Communications, April 27, 1994. Thesis title: “Randomized Hough Transform: New Extensions.”
- Licentiate of Science (Technology), LUT, Lappeenranta, Finland, major subject: Computer Science and Engineering, minor subject: Data Communications, March 31, 1993. Thesis title: “Motion Analysis by the RHT method in Computer Vision.”
- Master of Science (Technology), LUT, Lappeenranta, Finland, major subject: Computer Science and Engineering, September 27, 1989. Thesis title: “Graph Comparison Algorithms in Computer Vision” (in Finnish).
- Matriculation examination, Armila Senior High School, Lappeenranta, Finland, May 1982.

#### 4. Other education and training, qualifications and skills

- Management and leadership skill training, 5 days, LUT, 1995-1996, 4 days, LUT, 2004, 3 days, LUT, 2010, 4 days, LUT, 2014.

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<sup>1</sup> The name of the university was changed from Lappeenranta University of Technology (LUT) from January 2019.

<sup>2</sup> <http://www2.it.lut.fi/mvpr/>

<sup>3</sup> University contact information: LUT University, P.O. Box 20, FI-53851 Lappeenranta, Finland, +358 294 462 111, [kirjaamo@lut.fi](mailto:kirjaamo@lut.fi)

**5. Linguistic skills**

- Mother tongue: Finnish.
- English: very good.
- Swedish: satisfactory.

**6. Current position**

- Professor of Computer Science and Engineering, Lappeenranta University of Technology, from November 1, 1999 to present.
- Research career phase: Phase 4 Leading Researcher as a Professor.

**7. Previous work experience****Employment relations**

- Visiting Professor, Department of Computer Graphics and Multimedia (DCGM), Faculty of Information Technology, Brno University of Technology, Czech Republic, April 2017 - June 2017.
- Professor of Computing, School of Information Technology, Monash University Malaysia, September 2015- June 2016.
- Visiting Professor, Department of Computer Graphics and Multimedia (DCGM), Faculty of Information Technology, Brno University of Technology, Czech Republic, September 2012 - April 2013.
- Visiting Professor, Center for Machine Perception (CMP), Faculty of Electrical Engineering, Czech Technical University, Prague, Czech Republic, April 2011 - April 2013.
- Visiting Professor, Centre for Vision, Speech, and Signal Processing (CVSSP), Department of Electronic and Electrical Engineering, School of Electronic Engineering and Physical Sciences, University of Surrey, UK, September 2003 - August 2004.
- Visiting Professor, Centre for Vision, Speech, and Signal Processing (CVSSP), Department of Electronic and Electrical Engineering, School of Electronic Engineering and Physical Sciences, University of Surrey, UK, August 2001 - July 2002.
- Associate Professor, LUT, December 1, 1997 - November 30, 2002. Nomination to the 5-year position. The nomination ended November 1, 1999 when the full professorship started.
- Acting Associate Professor, LUT, August 1997 – December 1997.
- Acting Professor, LUT, July 1996 - July 1997.
- Visiting Research Fellow, Centre for Vision, Speech, and Signal Processing (CVSSP), Department of Electronic and Electrical Engineering, School of Electronic Engineering and Physical Sciences, University of Surrey, UK, July 1995 - June 1996.
- Acting Associate Professor, LUT, January 1995 - June 1995.
- Research Fellow, LUT, October 1989 - December 1994.
- Research Assistant/Teaching Assistant, LUT, March 1987 - September 1989.

**8. Research funding as well as leadership and supervision**

## Research funding as a principal investigator

The research funding is as follows:

- 5.868.000 EUR in total in 50 projects.
- Funded by research funding agencies, e.g., Academy of Finland, Royal Society (UK), Finnish Funding Agency for Technology and Innovation (Tekes/Business Finland), and European Union (EU), and by several SMEs and large-sized companies mainly in ICT, healthcare, and the forest and metal industry, including, for example, ABB, Andtriz, Delfoi, Capricode, Cavitar, Finnos, FinScan, Janesko, Konecranes, Kuomed, MAG, Metso Automation, Metso Paper, Pixact, Pfizer, M-Real, Mondi Business Paper Services, Nokia Networks, Nokia Research Center, Perimetria, Ovako Steel, Santen, Savled, Stora Enso, TeliaSonera, Tieto, UPM-Kymmene, Wetend Technologies.

The list of the selected projects as a responsible leader:

- Component-based Software Architecture in Global Telecom Service Business, 15.03.2001-14.03.2003. Collaboration: LUT (responsible organization), Sonera Research Center, Finland. Funding: companies 256.432 EUR (LUT).
- Intelligent Information Processing in Image Analysis, 01.08.2001-31.07.2002. Collaboration: LUT (responsible organization), University of Surrey (UniS), UK. Funding: Academy of Finland 116.427 EUR (LUT).
- Paper and Board Printability Testing Using Machine Vision (PapVision), 01.08.2003–31.12.2006. Collaboration: LUT (responsible organization), Aalto University (Aalto), Finland, University of Joensuu (UJo), Finland. Funding: Tekes (Finnish Funding Agency for Technology and Innovation), European Union/ERDF, and companies 942.187 EUR (LUT).
- Gabor Features in Industrial Machine Vision, 01.08.2004-31.12.2007. Collaboration: LUT (responsible organization), UniS. Funding: Academy of Finland 152.000 EUR (LUT).
- Application Strategies of New Technologies in Industrial Automation (ANTI), 01.09.2004-31.07.2007. Collaboration: Aalto (responsible organization), LUT, Tampere University of Technology (TUT), Finland, Technical Research Center of Finland (VTT). Funding: Tekes and companies 218.100 EUR (total consortium funding 857.100 EUR).
- Integration of Visual and Tactile Sensing for Robots (TacVision), 01.09.2005-31.08.2009. Collaboration: LUT MVPR, LUT Mechatronics (responsible organization). Funding: Tekes and companies 247.799 EUR (total consortium funding 470.000 EUR).
- Optimal Detection and Decision-Support Diagnosis of Diabetic Retinopathy (ImageRet), 01.01.2006–28.02.2009. Collaboration: LUT (responsible organization), University of Kuopio (UKu), Finland, UJo. Funding: Tekes/FinnWell and companies 272.904 EUR (total consortium funding 750.945 EUR).
- Learning Real-time Analysis and Control System for Turning (FeedChip), 01.01.2006-31.12.2009. Collaboration: LUT MVPR, LUT Energy, LUT Machine (responsible organization). Funding: Tekes and companies 90.954 EUR (total consortium funding 430.486 EUR).
- Fusion of Digital and Visual Print Quality (DigiQ), 01.05.2006–30.04.2009. Collaboration: Aalto (responsible organization), University of Helsinki (HU),

Finland, LUT, TUT. Funding: Tekes and companies 447.500 EUR (total consortium funding 1.488.000 EUR).

- Computational Saliency Based Approach for Print Quality Assessment (VisiQ), 01.01.2008–31.12.2011. Collaboration: LUT (responsible organization), Aalto. Funding: Academy of Finland 184.000 EUR (total consortium funding 368.000 EUR).
- Image-based measurement methods for quality in pulping and papermaking (QVision), 01.01.2009–30.06.2010. Collaboration: LUT (responsible institution), HU, Jyväskylä University (JyU), Finland (2 units), Numerola Oy, University of Oulu (OU), Finland (3 units), TUT, University of Eastern Finland (UEF), Finland. Funding: Tekes, ForestCluster Ltd. 165.000 EUR (total consortium funding 1.155.000 EUR).
- Management of web uniformity based on imaging measurements, WP7 of Efficient Networking towards Novel Products and Processes (EffNet), 01.07.2010–30.06.2011. Collaboration: TUT (responsible institution), HU, JyU (2 units), LUT, Metso, OU (3 units), UEF. Funding: Tekes, ForestCluster Ltd. 100.000 EUR (total consortium funding 1.246.000 EUR).
- Imaging and machine vision applications in the wet stage of the pulp and paper production (PulpVision), 01.01.2010–31.10.2014. Collaboration: Mikkeli University of Applied Sciences (MAMK/FiberLaboratory, responsible organization), LUT, UEF, OU. Funding: Tekes, European Union/ERDF and companies 709.886 EUR (total consortium funding 2.577.795 EUR).
- Computational psychology of experience in human-computer interaction (COPEX), 01.01.2013-31.12.2015. Collaboration: HU (responsible organization), LUT. Funding: Academy of Finland 348.541 EUR (total consortium funding 689.739 EUR).
- Machine level intelligence, sensing, control and actuation (MASCA), SHOK Program Smart technologies for lifecycle performance (FIMECC S-Step), 01.06.2014-30.06.2015. Collaboration: Aalto, LUT, TUT, VTT, FIMECC, Ltd. (responsible organization) and companies. Funding: Tekes and companies 90.962 EUR (total consortium funding 5.521.923 EUR).
- Digitalization leap in the sawmill industry (DigiSaw), 01.09.2017–31.08.2019. Collaboration: LUT, Brno University of Technology, Massachusetts Institute of Technology (MIT), and companies. Funding: Tekes and companies 416.670 EUR.
- Automatic segmentation of overlapping objects for cell image analysis (CellVision), 01.01.2018-31.12.2019. Collaboration: LUT, University of Texas at Austin. Funding: Academy of Finland 269.819 EUR.
- Towards sustainable coexistence of seals and humans (CoExist), 01.03.2019-28.02.2022. Collaboration: LUT, UEF (responsible organization), The Finnish Association for Nature Conservation, Interregional charitable public organization "Biologists for nature conservation", Russia. Funding: European Union 138.850 EUR (total consortium funding 620.880 EUR).
- Life in the fast lane: Computational vision and machine learning to unveil biodiversity dynamics and ecosystem responses in the planktonic realm (FASTVISION), 01.09.2019-31.08.2021. Collaboration: Finnish Environment Institute (SYKE). Funding: Academy of Finland 214.276 EUR (total consortium funding 428.552 EUR).

## Supervisions

**As the primary supervisor**

1. Ville Kyrki, Local and Global Feature Extraction. Doctoral thesis, LUT, 2002. Primary supervisor.
2. Kari Smolander, On the Role of Architecture in Systems Development. Doctoral thesis, LUT, 2003. Primary supervisor.
3. Joni-Kristian Kämäräinen, Feature Extraction Using Gabor Filters. Doctoral thesis, LUT, 2003. Primary supervisor.
4. Uolevi Nikula, Introducing Basic Systematic Requirements Engineering Practices in Small Organizations with an Easy to Adopt Method. Doctoral thesis, LUT, 2004. Primary supervisor.
5. Jarkko Vartiainen, Measuring irregularities and surface defects from printed patterns. Doctoral thesis, LUT, 2007. Primary supervisor.
6. Jarmo Ilonen, Supervised Local Image Feature Detection. Doctoral thesis, LUT, 2007. Primary supervisor.
7. Olli Alkkio, Sensor Fusion of Proprioception, Force and Vision in Estimation and Robot Control. Doctoral thesis, LUT, 2009. Primary supervisor.
8. Diana Kalenova, Color and Spectral Image Assessment Using Novel Quality and Fidelity Techniques. Doctoral thesis, LUT, 2009. Primary supervisor.
9. Tuomas Eerola, Computational Visual Quality of Digitally Printed Images. Doctoral thesis, LUT, 2010. Primary supervisor.
10. Tomi Kauppi, Eye Fundus Image Analysis for Automatic Detection of Diabetic Retinopathy. Doctoral thesis, LUT, 2010. Primary supervisor.
11. Albert Sadovnikov, Computational Evaluation of Print Unevenness According to Human Vision. Doctoral thesis, LUT, 2010. Primary supervisor.
12. Teemu Kinnunen, Bag-of-Features Approach to Unsupervised Visual Object Categorisation. Doctoral thesis, 2011. Primary supervisor.
13. Nataliya Strokina, Machine Vision Methods for Process Measurements in Pulping. Doctoral thesis, LUT, 2013. Primary supervisor.
14. Sahar Zafari, Segmentation of Partially Overlapping Convex Objects in Silhouette Images, Doctoral thesis, LUT, 2018. Primary supervisor.

**As the secondary supervisor/contributor**

1. Panagiota Bosgonianni, Mixed Pixel Classification in Remote Sensing. Doctoral thesis, University of Surrey, U.K., 1996. Primary supervisor Prof. Maria Petrou.
2. Eugene Ageenko, Context-Based Compression of Binary Images. Doctoral thesis, University of Joensuu, 2000. Primary supervisor Prof. Pasi Fränti.
3. Arto Kaarna, Multispectral Image Compression Using the Wavelet Transform. Doctoral thesis, LUT, 2000. Primary supervisor Prof. Jussi Parkkinen.
4. Miroslav Hamouz, Feature-Based Affine-Invariant Detection and Localization of Faces. Doctoral thesis, University of Surrey, UK, 2004. Primary supervisor Prof. Josef Kittler.
5. Leena Ikonen, Distance Transforms on Gray-level Surfaces. Doctoral thesis, LUT, 2006. Primary supervisor Prof. Pekka Toivanen.
6. Ossi Taipale, Observations on Software Testing Practice. Doctoral thesis, LUT, 2007. Primary supervisor Prof. Kari Smolander.
7. Lea Hannola, Challenges and Means for the Front End Activities of Software Development. Doctoral thesis, LUT, 2009. Primary supervisor Prof. Markku Tuominen.

8. Joonas Pekkarinen, Laser Cladding with Scanning Optics. Doctoral Thesis, LUT, 2014. Primary supervisors Prof. Veli Kujanpää and Prof. Antti Salminen.
9. Jukka Lankinen, Local Features in Image and Video Processing - Object Class Matching and Video Shot Detection. Doctoral Thesis, LUT, 2014. Primary supervisor Prof. Joni-Kristian Kämäräinen.
10. Siti Khairuni Amalina Kamarol, Feature Extraction and Representation Techniques for Facial Expression Analysis, Monash University Malaysia, 2017. Primary supervisors Dr. Mohamed Hisham Jaward and Associate Professor Rajendran Parthiban.
11. Toni Kuronen, Moving Object Analysis and Trajectory Processing with Applications in Human-Computer Interaction and Chemical Processes, Doctoral thesis, LUT, 2018. Primary supervisor Prof. Lasse Lensu.
12. Esko Lahdenperä, Mass Transfer Modeling in Slow-Release Dissolution and in Reactive Extraction Using Experimental Verification, Doctoral thesis, LUT, 2019. Primary supervisor Prof. Tuomas Koironen.

Supervised theses of undergraduate students at LUT: 153 (M.Sc.), 13 (B.Sc.).

## **9. Merits in teaching and pedagogical competence**

### **Curriculum planning and course implementation**

- Deputy Head, School of Information Technology, Monash University Malaysia, 2015-2016. Responsible for the heads of the degree programs.
- Director/Vice Director, the East Finland Graduate School in Computer Science and Engineering (ECSE), Director 1999-2009, Vice Director 2010. Responsible for the graduate training in East Finland (LUT, University of Joensuu, University of Kuopio).
- Head of Degree Program in Computer Science and Engineering, LUT, Finland, 2007-2010. Responsible for the degree program.
- Head of Major Subject in Intelligent Computing, 1996-2001, 2005-2008, LUT, Finland. Responsible for the major subject.
- Member of Steering Committee, International Master Degree Program in Computer Science and Engineering, 1996-2001, LUT. Responsible for establishing the first international master degree program of all degree programs at LUT, and the first international master degree program in the field of Computer Science and Engineering in Finland with Professor Jussi Parkkinen and Professor Jan Voracek with six international partner universities.

### **Course implementation**

Responsible for numerous courses since 1986 (most of courses repeated many times):

- Foundations of Information Processing. Bachelor level.
- Foundations of Computer Science. Bachelor level.
- C Programming Language. Bachelor level.
- Fortran Programming Language. Bachelor level.
- Fundamentals of Programming. Bachelor level.
- Data Structures and Algorithms. Bachelor level.
- Design of Algorithms. Bachelor level.

- Operating Systems. Bachelor level.
- Databases. Bachelor level.
- Information Management Systems. Bachelor level.
- B.Sc. Thesis Seminar. Bachelor level.
- Artificial Intelligence. Master level.
- Knowledge Management and Expert Systems. Master level.
- Machine Vision. Master level.
- Machine Vision and Digital Image Analysis. Master level.
- Machine Vision and Pattern Recognition. Master level.
- Machine Vision and Pattern Recognition Applications. Master level.
- Pattern Recognition. Master level.
- Research Methods. Master level.
- Seminar on Data Processing. Master level.
- Seminar on Information Processing. Master level.
- Seminar on Intelligent Computing. Master level.
- Seminar on Intelligent Processing. Master level.
- Seminar on Computer Vision and Pattern Recognition. Master level.
- Final Year Project. Master level.
- M.Sc. Thesis Seminar. Master level.
- Research Seminar on Information Technology. Postgraduate level.
- Advanced Topics in Information Processing. Postgraduate level.
- Advanced Topics in Intelligent Computing. Postgraduate level.
- IT Research Methods, Postgraduate level.
- Intensive Program on Computer Vision (IPCV), international summer school 1998, 2000, 2002, 2014. Postgraduate level.

### **Development of teaching methods**

1. Markku Kuivalainen, Lasse Lensu, Arto Kaarna, Heikki Kälviäinen. Tools for virtual learning environment in computer science education. In 15th EAEEIE Annual Conference on Innovation in Education for Electrical and Information Engineering (EIE), pages 93-98, Sofia, Bulgaria, May 27–29, 2004.
2. Timo Rongas, Arto Kaarna, Heikki Kälviäinen, Comparison of Digital Learning Tools in Introductory Programming, Proceedings of 15th EAEEIE Annual Conference on Innovation in Education for Electrical and Information Engineers, Sofia, Bulgaria, May 27-29, 2004, pp. 137-142.
3. Timo Rongas, Arto Kaarna, Heikki Kälviäinen, Classification of Computerized Learning Tools For Introductory Programming Courses, Proceedings of the 4th International Conference on Advanced Learning Technologies (ICALT 2004), Joensuu, Finland, Aug 30-Sep 1, 2004, pp. 678-680.
4. Timo Rongas, Lasse Lensu, Arto Kaarna, Heikki Kälviäinen. ALOHA: Visual learning tool for comprehending program structure in introductory programming. In Proceedings of 16th EAEEIE Annual Conference on Innovation in Education for Electrical and Information Engineering (EIE) [CD-ROM], Lappeenranta, Finland, June 6-8, 2005. Paper ID 41.

### **Supervision of theses**

Supervised theses of undergraduate students at LUT: 153 (M.Sc.), 13 (B.Sc.).

## 10. Awards, prizes and honours

- The best professional paper presentation award of the conference.  
Kälviäinen, H., Kukkonen, S., Parkkinen, J., Hyvärinen, T., Quality Control in Tile Production. Conference of SPIE Intelligent Robots and Computer Vision XVII: Algorithms, Techniques, and Active Vision, Boston, MA, USA, November 2-5, 1998.
- The best scientific author at LUT, LUT Foundation, 2004.
- IS&T Charles E. Ives Journal Award, the best journal article in 2010.  
Eerola, T., Lensu, L., Kamarainen, J.-K., Leisti, T., Halonen, R., Kälviäinen, H., Nyman, G., Oittinen, P., Full Reference Printed Image Quality: Measurement Framework and Statistical Evaluation, Journal of Imaging Science and Technology (JIST), Vol. 54, No. 1, 2010, pp. 010201-010213.
- IEEE Senior Member, 2012-present.
- SPIE Senior Member, 2017-present.
- Science Award, the most qualified researcher at LUT, LUT Foundation, 2019.

## 11. Other academic merits

### Reviewer of the Ph.D. theses (written/oral examination/grading)

1. Kari Saarinen, Tampere University of Technology (TUT), Finland, 1999.
2. Hannu Kauppinen, University of Oulu (UO), Finland, 1999.
3. Vladimir Melnik, TUT, Finland, 2000.
4. Markus Peura, Helsinki University of Technology (HUT), Finland, 2000.
5. Jiangming Liang, University of Turku (UT), Finland, 2001.
6. Tapio Repo, UO, Finland, 2002.
7. Markus Varsta, HUT, Finland, 2002.
8. Jani Mäntyjärvi, UO, Finland, 2003.
9. Toni Tamminen, HUT, Finland, 2005.
10. Juha Koikkalainen, HUT, Finland, 2005.
11. Edward Jaser, University of Surrey, UK, 2005.
12. Perttu Laurinen, UO, Finland, 2006.
13. Jussi Lindgren, HUT, Finland, 2008.
14. Jari Hannuksela, UO, Finland, 2008.
15. Petri Österberg, TUT, Finland, 2009.
16. Heli Koskimäki, UO, Finland, 2009.
17. Masayuki Ukishima, University of Eastern Finland (UEF)/Chiba University, Japan, 2010.
18. Diego Fiorin, University of Padova, Italy, 2011.
19. Marius Pedersen, University of Oslo, Norway, 2011.
20. Vili Kellokumpu, UO, Finland, 2011.
21. Roman Juránek, Brno University of Technology (BUT), Czech Republic, 2012.
22. Jiri Havel, BUT, Czech Republic, 2012.
23. Jukka Antikainen, UEF, Finland, 2012.
24. Markéta Dubská, BUT, Czech Republic, 2014.
25. Michal Hradiš, BUT, Czech Republic, 2014.

26. Sharif Chowdhury, TUT, Finland, 2016.
27. David Bařina, BUT, Czech Republic, 2016.
28. Matti Matilainen, UO, Finland, 2017.
29. Teo Asplund, Uppsala University, Sweden, 2019.
30. Javier Aldana luit, Czech Technical University, Czech Republic, 2020.

### **Reviewer of the milestone reports of doctoral students (written/oral examination)**

1. Kokum Weeratunge, Monash University, 2015.
2. Tey Wei Keat, Monash University, 2015.
3. Mahmudul Hassan, Monash University, 2016.
4. Ali Moltajaei Farid, Monash University, 2016.
5. Kuan Yew Leong, Monash University, 2016.

### **Memberships and positions of trust in scientific and scholarly societies**

- ACM, lifetime member.
- International Society for Pattern Recognition (IAPR), lifetime member.
  - IAPR governing board, member, 2006-present.
  - Pattern Recognition Society of Finland, lifetime member.
- IEEE, senior member since 2012.
- SPIE, lifetime senior member since 2017.

### **Associate editor**

- Applied Informatics, Springer, 2013-present.
- Machine Vision and Applications, Springer, 2012-2019.
- Pattern Recognition and Image Analysis, Springer, 2000-present.
- Pattern Recognition Letters, Elsevier, 2014-present.

**Reviewer:** in several scientific journals and conferences.

### **Conference (CC) and program committees (PC)**

10th Scandinavian Conf. on Image Analysis (SCIA), Lappeenranta, Finland, 1997, CC, Local Chair. 5th Int. Conf. on Pattern Recognition and Image Analysis (PRIA), Samara, Russia, 2000, PC. Conf. on Advanced Concepts and Intelligent Vision Systems (ACVIS), Baden-Baden, Germany, 2001, PC. 7th Int. Conf. on Pattern Recognition and Image Analysis (PRIA), St. Petersburg, 2004, PC. 14th SCIA, Joensuu, Finland, 2005, Program Chair, CC. 8<sup>th</sup> PRIA, Yoshkar-Ola, Russian Federation, 2007, CC. 9<sup>th</sup> PRIA, Nizhni Novgorod, Russian Federation, 2008, CC. 19th Int. Conf. on Pattern Recognition (ICPR), Tampa, USA, 2008, CC. 20<sup>th</sup> ICPR, Istanbul, Turkey, 2010, CC. Sino-foreign-interchange Workshop on Intelligence Science and Intelligent Data Engineering (IScIDE), Harbin, China, 2010, PC. Int. Conf. on Computer Vision and Graphics (ICCVG), Warsaw, Poland, 2010, CC. 10th PRIA, Russian Federation, 2010, CC. IScIDE Xi'an, China, 2011, PC. IAPR International Workshop on Statistical Techniques in Pattern Recognition (SPR), Hiroshima, Japan, 2012, PC. ICCVG, Warsaw, Poland, 2012, CC. IScIDE, Nanjing, China, 2012, PC. 21st ICPR, Tsukuba Science City, Japan, 2012, CC. IScIDE, Beijing, China, 2013, PC. 11th PRIA, Samara, Russian Federation, 2013, PC. IAPR

Joint Int. Workshops on Statistical Techniques in Pattern Recognition (SPR 2014) and Structural and Syntactic Pattern Recognition (SSPR 2014), Joensuu, Finland, 2014, PC. International Conference on Pattern Recognition Applications and Methods ICPRAM, 2014, Angers, France, PC. 22nd ICPR, Stockholm, Sweden, 2014, CC. ICCVG, Warsaw, Poland, 2014, CC. IScIDE, Suzhou, China, 2015, PC. 23rd ICPR, Cancun, Mexico, 2016, CC. ICCVG, Warsaw, Poland, 2016, CC. 9th ACIIDS, ICVSA, Japan, 2017, PC. 33rd SCCG, Mikulov, Czech Republic, CC, 2017. 20th SCIA, Tromsø, Norway, 2017, PC. ICCVG, Warsaw, Poland, 2018, CC. 21st SCIA, Norrköping, Sweden, 2019, PC. International Conference Cyber-Physical Systems and Control (CPS&C 2019), St. Petersburg, 2019, CC.

### **Summer school chair**

6<sup>th</sup>, 7<sup>th</sup>, 10<sup>th</sup> ECSE Summer School in Novel Computing, 1999, 2000, 2003. Intensive Program on Computer Vision (IPCV 2000).

### **Conference session chair**

10th SCIA, Lappeenranta, Finland, 1997. 11<sup>th</sup> SCIA, Kangerlussuaq, Greenland, 1999. 12th SCIA, Bergen, Norway, 2001. 6th PRIA, Velikiy Novgorod, Russian Federation, 2002. 7th PRIA, St. Petersburg, Russian Federation, 2004. EAEEIE Annual Conf. on Innovation in Education for Electrical and Information Engineers, Lappeenranta, Finland. 14<sup>th</sup> SCIA, Joensuu, Finland, 2005. 18<sup>th</sup> ICPR, Hong Kong, China, 2006. 15th SCIA, Aalborg, Denmark, 2007. 9th PRIA, Nizhni Novgorod, Russian Federation, 2008. Int. Conf. on Systems, Man, and Cybernetics (SMC), Singapore, 2008. 19th ICPR, Tampa, USA, 2008. IScIDE, China, 2010. ICCVG, Warsaw, Poland, 2010. 10th PRIA, Russian Federation, 2010. 16th SCIA, Ystad, Sweden, 2011. ACIVS, Brno, Czech Republic, 2012. ICCVG, Warsaw, Poland, 2012. IScIDE, Nanjing, China, 2012. 17th SCIA, Espoo, Finland, 2013. 33rd SCCG, Mikulov, Czech Republic, 2017. 20th SCIA, Tromsø, Norway, 2017. 21st SCIA, Norrköping, Sweden, 2019.

### **Evaluator in filling Professor's chairs**

Professor of Computer Science, University of Oulu, Finland, 2000. Professor of Computer Science, University of Kuopio, Finland, 2001. Professor of Computer Science, University of Joensuu, Finland, 2006. Professor of Computer Science, University of Joensuu, Finland, 2008. Professor of Computer Graphics and Multimedia, Brno University of Technology, Czech Republic, 2014. Professor of Computer Science and Engineering, University of Oulu, Finland, 2014. Associate Professor of Computer Science, University Tunku Abdul Rahman, Malaysia, 2019.

### **Evaluator in filling the title of Docent (Adjunct Professor)**

Timo Ojala, University of Oulu, Finland, 2001. Oleg Okun, University of Oulu, Finland, 2003. Jyrki Lötjönen, Helsinki University of Technology, Finland, 2003. Jarmo Alander, University of Oulu, Finland, 2003. Sami Brandt, University of Oulu, Finland, 2007. Patrik Hoyer, University of Helsinki, Finland, 2009. Perttu Laurinen, University of Oulu, Finland, 2009. Heli Koskimäki, University of Oulu, 2016. Heikki Huttunen, Tampere University of Technology, Finland, 2017.

### **Administrative responsibilities** (numerous, only the selected ones shown here)

- Head of Computer Vision and Pattern Recognition Laboratory, Department of Computational and Process Engineering, School of Engineering Science, LUT, Finland, 2019-present.
- Deputy Head of School, School of Information Technology, Monash University Malaysia, 2015-2016.
- Vice Dean of Faculty, Faculty of Technology Management, LUT, Finland, 2011.
- Vice Chairman of Faculty Council, Board of the faculty council of Faculty of Technology Management, LUT, Finland. Vice Chairman 2011, Member, 2007-2012.
- Director of Graduate School, the East Finland Graduate School in Computer Science and Engineering (ECSE), Director 1999-2009, Vice Director 2010.
- Head of Department, Department of Information Technology, LUT, Finland, 2007-2011.
- Head of Degree Program, Degree Program in Computer Science and Engineering, LUT, Finland, 2007-2010.
- Head of Laboratory, Machine Vision and Pattern Recognition Laboratory, 2002-2011, Department of Information Technology, 2014-2015, Department of Mathematics and Physics, LUT, Finland.
- Member of Scientific Council, Board of the scientific council of Departments of Electrical Engineering and Information Technology, LUT, Finland. Member, 1998-2004. Vice Member 2005-2006.
- Vice Director of Research Center, Research Center IISSt-Lab (Intelligent Industrial Systems Laboratory), LUT, Finland, Vice Director 2002-2005, Member 1997-2005.
- Head of Laboratory, Laboratory of Information Processing, Department of Information Technology, LUT, 1996-2002, 2005-2008.

**Invited keynote lectures abroad:** numerous lectures since 1993 in many countries (Australia, Bulgaria, Canada, China, Chile, Czech Republic, Germany, Hungary, Hong Kong, Japan, Malaysia, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Spain, Sweden, Switzerland, United Kingdom, USA).

### **31. Scientific and societal impact of research**

#### **Publications**

- See <http://personal.lut.fi/users/heikki.kalviainen/bibliography.html> for the details.
- Number of publications according to categories defined by the Ministry of Education and Culture: A 216, B 2, C 3, D 45, E 5, F 0, G 3, H 1, I 1; in total 276.
- Number of publications according to Publication Forum<sup>4</sup> classes (3, 2, 1):  
7, 18, 130.
- H-index:  
30 (Google Scholar).  
15 (Web of Knowledge).  
21 (Scopus).

<sup>4</sup> <http://www.tsv.fi/julkaisufoorumi/english.html?lang=en>

- Number of citations: 4721 (Google Scholar).

### **Production of research data**

1. Kälviäinen, H., Hirvonen, P., and Oja, E., Houghtool--a Software Package for the Use of the Hough Transform, *Pattern Recognition Letters*, Vol. 17, No. 8, 1996, pp. 889-897.
2. Kauppi, T., Kalesnykiene, V., Kamarainen, J.-K., Lensu, L., Sorri, I., Pietilä, J., Kälviäinen, H., and Uusitalo, H.. Diaretdb0 – standard diabetic retinopathy database: Calibration level 0. Electronic material (Online), 2006. Available at <http://www2.it.lut.fi/project/imageret/diaretdb0/>.
3. Kauppi, T., Kalesnykiene, V., Kamarainen, J.-K., Lensu, L., Sorri, I. Raninen, A., Voutilainen, R., Pietilä, J., Kälviäinen, H., and Uusitalo, H.. Diaretdb1 – standard diabetic retinopathy database: Calibration level 1. Electronic material (Online), 2007. Available at <http://www2.it.lut.fi/project/imageret/diaretdb1/>.
4. Hiltunen, V., Eerola, T., Lensu, L., Kälviäinen, H., Comparison of General Object Trackers for Hand Tracking in High-Speed Videos, Proceedings of the 22st International Conference on Pattern Recognition (ICPR2014), Stockholm, Sweden, 2014, Electronic material (Online), Available at <http://www2.it.lut.fi/project/copex/hshanddb01/index.shtml>
5. Zafari, S., Eerola, T., Sampo, J., Kälviäinen, H., Haario, H., Segmentation of Overlapping Elliptical Objects in Silhouette Images, *IEEE Transactions on Image Processing*, Vol. 24, No. 12, 2015, pp. 5942-5952, Electronic material (Online), Available at <http://www2.it.lut.fi/project/comphi1/index.shtml>

### **Inventions and commercialization**

- Learning Real-time Analysis and Control System for Turning, Patent application FI2009/050957 pending, filed 2009.
- The PapVision measuring device by LabVision Technologies, Ltd. based on the results of the PulpVision project.

### **32. Positions of trust in society and other societal merits**

- Governing board of LUT, Vice Member, 2000-2001.
- Governing board of the Finnish Union of Professors, Section of the Lappeenranta University of Technology, Member, 2000-present. Several duties, e.g., Secretary 2000, Vice Shop Steward, 2014-2015.
- Governing board of the International Society for Pattern Recognition (IAPR), Member, 2006-present.
- University collegium of LUT, Vice Member, 2010-2012, 2017-2020.
- IT4I Research Council, Czech Republic, Member, 2013-present.